

# Feeding of Mothers and Children Under Emergency Conditions

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Infants, children, and pregnant and lactating women, even though healthy and uninjured, are generally conceded to need special consideration under emergency conditions. They have heightened nutritional needs that cannot be met in full from the food allowance for the "normal consumer." Failure to meet these needs may have lasting consequences for the human resources of the Nation. Provision for dependents sustains the morale of heads of families who are working in essential industries and in civil defense.

Although the special problems associated with feeding these groups vary with the intensity and duration of the emergency, any plan for providing food under conditions of stress should meet at least three criteria.

Hunger must be allayed and physiological needs for maintenance of health and for normal growth should be met. The essential nutrients must be provided in a form and under conditions that avoid any danger to health through contamination, whether bacteriological, chemical, or radiological. Both the foods and conditions of feeding should help to minimize psychological trauma associated with the disaster

and, insofar as possible, should contribute to a sense of security.

These criteria shift in relative importance according to the specific age group in question and the severity and duration of the emergency.

Since the emphasis in civil defense food planning in the United States has been on an emergency period of less than 30 days, the problems associated with special groups for that period are given chief consideration in this discussion with but brief reference to a more prolonged state of abnormal food supplies and facilities. We have thought of this emergency as affecting a population which in the main has had enough food and consequently is in reasonably good nutritional condition. We have also assumed the existence of sufficient supplies of food to meet minimal emergency needs of normal consumers plus enough processed foods to supplement the diet of vulnerable groups for the immediate postdisaster period. A third assumption is that civilian food rationing is not in effect at the outset of the emergency.

## Meeting Physiological Needs

The recommended dietary allowances of the National Research Council that apply to mothers and children provide the objective toward which emergency food plans should strive. Insofar as possible the needs for energy, protein, and thiamine of such especially vulnerable groups as children under 2 years and lactating women should be met even during short periods of emergency feeding. The recommended allowances of these nutrients amount to:

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Group	Calories	Protein (gm.)	Thiamine (mg.)
Infants under 1 year	800	25	0.4
Children 1 to 2 years	1,200	40	.6
Lactating women	3,000	100	1.5

If these essential nutrients are eaten in the form of such foods as milk, bread, and potatoes, other vitamins and minerals will also be supplied in quantities that, added to those stored in the tissues of well-nourished individuals, will meet minimal requirements for a few days or even weeks.

### Priorities Among Mothers and Children

During an acute emergency when it may be impossible to make special provision for all mothers and children, it is recommended that the first to receive attention be infants under 2 years of age and lactating women. For periods of less than a week, healthy and previously well-fed children over 2 and pregnant women should not suffer by subsisting on the food made available to the general population. For emergencies of more than a week, it is hoped that children between the ages of 2 and 6 years and women during the last half of pregnancy can be added to the groups receiving supplementary foods. During periods of prolonged food shortage, it is highly desirable that children of school age be added to the groups for which supplementary foods are provided, probably through meals served at school or in child care institutions. Although the special nutritional requirements of adolescents are recognized, it does not seem feasible to make special provision for them unless they are attending school or are engaged in an essential industry or civil defense work. Under these circumstances they can be supplied with at least one meal in addition to those eaten with the family.

### Water and Milk

Water is the most essential of all nutrients, especially for infants. Pediatricians estimate that the daily allowance, including water used in the milk formula and in the cooking of cereal porridges, should be approximately 1 quart per day. An equal quantity of water as such or in beverages should meet the minimal needs of older children for drinking except in very hot

or dry climatic conditions. The infant's need for water as such is obviously made more acute by the general reliance on concentrated milks for infant formulas in the absence of ample safe supplies of fresh fluid milk. Provision of uncontaminated water therefore takes a top priority in child feeding programs. The household emergency shelf should provide ample supplies of potable water for dilution of the infant's milk mixture. If water is temporarily unavailable, other suitable fluids, such as bottled fruit beverages and mineral water, might be used in the formula.

A suitable source of energy to allay hunger and support activity and growth ranks next in importance to water. For infants under 2 years of age this means whole milk supplemented chiefly by cereals. The form of milk suggested for emergency child feeding in urban areas of the United States is evaporated (unsweetened condensed) milk, available in cans containing the equivalent of slightly less than 1 quart of fresh fluid milk. Practically all evaporated milk is fortified with vitamin D (chiefly in the form of 7-dehydrocholesterol) in the concentration of 400 international units to the reconstituted quart. Because this milk is widely used in infant feeding under normal conditions, it is a familiar and acceptable food. A daily allowance of one 14½-ounce can per child under 2 will allow for inevitable losses in preparation and for rejection of individual feedings by young infants. It will also compensate in part for shortages in other foods that are normally consumed by children from 1 to 2. If supplies of whole milk are not sufficient to provide the equivalent of 1 quart to all children under 2, infants under 6 months of age and nursing mothers should be taken care of first. Whatever is left could be prorated among the group between 6 months and 2 years.

As British experience in World War II has demonstrated convincingly, another form of milk that is satisfactory for emergency feeding, when safe water and facilities for reconstitution are available, is spray-dried whole milk. Preference should be given to those brands that are fortified with vitamin D. Four and one-half ounces of dried whole milk represent the solids in 1 quart of fresh whole milk.

Sugar is commonly added to infant formulas

of diluted whole milk as a supplementary source of energy. If uncontaminated sugar is not available, an equal quantity of a less dilute milk mixture will meet energy needs without causing digestive disturbances, provided that the milk has been modified by heat, as is evaporated milk, so that a finely divided curd is formed in the stomach. The baby, however, may indicate some displeasure at the absence of the familiar sweet taste in his feedings.

The usual practice of warming milk to body temperature before giving it to the infant may have to be abandoned in an emergency. Fortunately, there seems to be no evidence that bacteriologically safe unwarmed milk will cause digestive upsets.

In short, numerous adaptations to abnormal conditions can be made in providing milk without sacrifice of the infant's nutritional well-being.

For children over 2 and for pregnant and nursing mothers, skim milk can be used for part or all of their milk supply. The most readily available form of skim milk in American cities, nonfat dry milk solids, is well suited for emergency feeding if there is sufficient safe water and the necessary equipment for reconstituting the milk.

### Other Foods

Cereal products will constitute the principal source of energy for mothers and older children and a supplementary source for infants. The cereal foods that are manufactured especially for babies, fortified as they are with minerals and vitamins and requiring only the addition of milk or water to make them ready to serve, are well suited for emergency conditions. Bread, which will probably be the main source of energy for the population as a whole, can be soaked to a suitable consistency for even very young children. When bread must constitute such a large part of the ration, it is important that it be of superior nutritive value—made of whole grain or enriched flour and containing a significant proportion of milk solids.

Other foods that are commonly given to children to supply vitamins, minerals, and additional protein and energy can be dispensed with in emergency feeding of not more than 1

month's duration. However, if supplies should be readily available, they will contribute appreciably to the nutritive value of the diet and to the peace of mind of mothers and children. American children under 2 normally consume large quantities of canned foods packed especially for their age—sieved or chopped fruits, vegetables, meat, and soup mixtures. These foods, which are packed in cans ranging from  $3\frac{1}{2}$  to 5 or more ounces and are reasonably acceptable to the young palate even without the customary warming, lend themselves to emergency feeding schemes as a supplement to milk and bread or cereal. For emergencies of short duration, it is not felt to be necessary to supply vitamin or mineral supplements for children under 2 or for pregnant and lactating women. Enriched bread and whole-grain or restored cereals, together with milk, will take care of most of the B vitamins and of iron. The use of fortified evaporated milk will provide protection against rickets for most infants who consume the equivalent of a quart. During a prolonged emergency, young infants who take considerably less than 1 quart of milk per day should be given 400 units of supplemental vitamin D if at all possible. For such long emergencies, it is highly desirable to provide minimal quantities of ascorbic acid (25 milligrams per day) for infants, especially those fed exclusively on milk and cereals.

During the second half of pregnancy and lactation, adequate protein to support growth of the fetus or of the young child is highly desirable although under emergency conditions it is secondary in importance to meeting energy needs. An adequate supply of energy from such natural foods as lightly milled or fortified grain products, potatoes, and dried legumes (pulses) will not only contribute substantial quantities of protein but will insure the availability for tissue-building of whatever protein is provided from these foods or from milk.

To summarize, emergency nutritional needs of infants, young children, and pregnant and lactating women would probably be met by the following daily allowances:

*For an emergency of even a few days' duration*

1. Infants under 6 months: 1 large can ( $14\frac{1}{2}$  ounces) evaporated milk, or  $4\frac{1}{2}$  ounces dried whole milk, or 1 quart whole milk. Preference to be given to milk forti-

fied with 400 international units of vitamin D per quart.

2. Children from 6 months to 2 years: Same quantity of whole milk as for infants under 6 months plus enough staple foods to satisfy hunger from whatever is available for rest of family or group.

3. Lactating women: One quart of whole or skim milk or its equivalent in evaporated or dried milk, preferably fortified with 400 international units of vitamin D to the quart plus full food allowance for other adults.

*For emergencies lasting more than 1 week*

These additional groups should also be provided for:

1. Children from 2 to 6 years: At least 1 pint of whole or skim milk or its equivalent in evaporated or dried milk, preferably fortified with 400 international units of vitamin D to the quart plus staple foods to satisfy hunger.

2. Women during the last half of pregnancy: Same as for lactating women.

### **Protection Against Contamination**

The usual hazards to infants and young children from contaminated water and milk are greatly increased under emergency conditions. Contamination from "peace-time bacteria" is likely to be the greatest threat since public water supplies may become polluted, facilities for sterilization by heat and for refrigeration nonexistent, and the job of preparing the food entrusted to inexperienced volunteers. In addition there are the potential dangers associated with atomic, biological, or chemical warfare.

Because water that has been made safe for general consumption by emergency treatment is believed suitable also for infants, those responsible for infant feeding under disaster conditions may well concentrate on techniques for formula preparation. Both the milk mixture and the container from which it is served should be free from contamination at the time of feeding. Experts in food sanitation can indicate safe emergency measures for sanitizing bottles and nipples when boiling water or steam is unobtainable. Terminal heating of the assembled unit—filled bottle with nipple in place and, if possible, protected by a nipple cap—should be employed whenever feasible. The time of sterilization in a boiling water bath should be the full 25 minutes currently recommended by the American Hospital Association for hospital formula rooms and by the Children's Bureau

for home use. In the household where refrigeration is unavailable, the bottles of sterilized formula should be left in the tightly covered container in which they were processed, removing only as many bottles as are needed for a feeding and replacing the cover on the kettle at once.

### **Bolstering Emotional Security**

The foods given to young children and the conditions of emergency feeding have profound implications for their emotional reaction to a disaster. The experience of war-ravaged countries has proved how important it is that infants and young children be given familiar foods by familiar hands. As the British reports during the Combined Conference on Administrative and Scientific Aspects of Food in Civil Defense in London brought home repeatedly to those of us from overseas, emergency feeding is not necessarily mass feeding. Especially in the case of infants and young children, every measure should be taken to provide the necessary food within the accustomed setting of the family, the home, or the immediate neighborhood. The household that has a few days' supply of essential foods and fluids for young children on its emergency shelf and that knows how to improvise equipment for cooking and cleansing may not have to expose its most vulnerable members to the disturbing surroundings of an emergency feeding center. When mass care cannot be avoided, either in a temporary rest center or in the course of evacuation, the presence of a familiar figure, preferably the mother, will help to minimize the sense of insecurity. If breast feeding can be maintained under emergency conditions, both mother and infant will benefit. It is to give all possible encouragement to the lactating mother that special food allowances are recommended for her under emergency conditions even of short duration. Physiologically, it is of little consequence that her nutritive needs be met during an emergency of a few days' duration. Psychologically, she may profit greatly from the recognition of the contribution that she is making to the well-being of her baby and to society.